Nat. Hazards Earth Syst. Sci. Discuss.,
https://doi.org/10.5194/nhess-2019-385-RC2, 2020
© Author(s) 2020. This work is distributed under
the Creative Commons Attribution 4.0 License.

Natural Hazards and Earth System Sciences
Open Access
Discussions

Interactive comment on "Residential building stock modelling for mainland China" *by* Danhua Xin et al.

Anonymous Referee #2

Received and published: 20 June 2020

The Introduction starts with some common sentences on earthquake loss and related action on the UN level, however, this paragraph is not very suitable to introduce the topic of the manuscript to the potential readers. Therefore, I kindly recommend re-writing. Moreover, the statement of world-wide earthquake loss should go clearly beyond the referred two studies of one of the co-authors of this manuscript. One more detail: For me it is not clear why in a paper from 2011 earthquake loss can be given in 2016 values, please clarify. Then the authors address the need to have information on the building stock level when risk assessment should be undertaken. The state that in cases where such information is not available, obtaining necessary information is not practicable. I strongly disagree with this statement, throughout the relevant literature there are many different methods presented of how to do so. This needs thorough

Printer-friendly version

Discussion paper

revision. Moreover, the authors elaborate on a method to compile such information by taking census data in consideration. How the building stock value is correlating to statistical information on population density (lines 49-57)? How did the authors generally treat the MAUP issue when using data bond to administrative borders? Further down the text body, the authors correctly state that "to better cope with this spatial mismatch between natural hazards [spatial occurrence] and administrative boundaries, building stock models should be geocoded with relatively high resolution and be disaggregated from more detailed census data". The last statement means that from a methodological point of view, such an assessment will not guide us to precise results that can be used as a proxy for the building stock. So somehow, the introductory section is unclear with respect to what the authors would like to show us in their study. Finally, the research gap is not properly defined, nor is the niche to be filled by this work easily accessible to potential readers.

In the method section the authors explain how they aggregated information on the building characteristics to information on the population density, both at a final resolution of 1 km grid cells. In this respect it remains unclear how the other building types were excluded from the grids, as information on e.g. building design and material in the statistics ("Long Table") are also related to other building types, right? -> Needs clarification.

Further on, the authors present different methods of how to merge different types of information such as the amount of buildings of different height or different construction type to these grid cells, resulting in a certain spatial probability for the different data. It remains open, however, how this information was finally be checked against the real world situation, and as such it remains open how e.g. information on population was distributed or allocated to different building categories. Occupation rate and building values were then allocated to the different building sub-categories, and spatially distributed over the grid cells.

Results of values per grid cell where then compared to (A) a study published by Wu

CC BY

et al. (2014) on the net capital stock, (B) more detailed information available on the residential floor area for the Shanghai district, and (C) an empirical earthquake vulnerability study published by one of the co-authors of this manuscript, linking vulnerability to reported loss. The authors conclude that the results from the present manuscript (in terms of what? Potential value of buildings? Potential loss resulting from an earthquake scenario?) are in line with results from other studies, a statement which cannot be supported by the referee evaluating the information provided by the authors. In the present form, the results of the study are not validated, they are only opposed to other studies on building values (in case A), to the area used for computation of values (in case B) and to vulnerability, linking the newly generated building values to an empirical vulnerability function and comparing the results to some loss reports available (in case C). With respect to the latter, further questions arise with respect to different construction types and their individual structural vulnerability concerning earthquakes, this needs careful interpretation and more information on the comparison performed. As such, the added value of the material presented here is not clear to me. Statements such as "Therefore, the estimated loss range, based on the buildings stock model developed in this study and the empirical loss function developed in Daniell (2014), is quite compatible with that given in previous studies. This compatibility further validates the robustness of our residential building stock model" (lines 392ff.) may be right but cannot be proven from what the authors have shown.

Finally, information given in the conclusion is by far too generalized, instead, the overall limitation and the specific ones, such as those arising from the use of aggregated statistical data and the underlying factors, should be discussed in detail.

Hence, I cannot recommend publication of the work in its present form, the manuscript needs major revisions in terms of (1) problem statement, including extended literature review, (2) explanation of methods, (3) compilation of results, and – most important – (4) discussion, including discussion on limitations and uncertainties, so that (5) sound conclusions will become possible.

Printer-friendly version

Discussion paper

Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., https://doi.org/10.5194/nhess-2019-385, 2020.

Printer-friendly version

Discussion paper